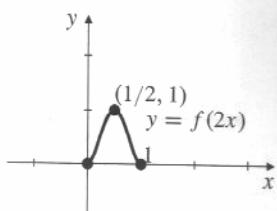
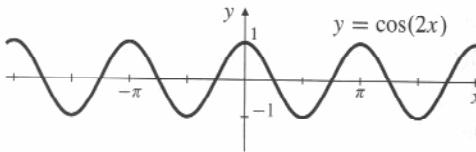


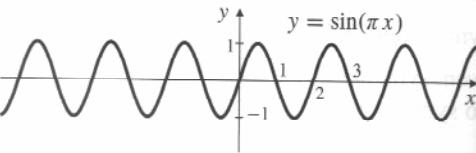
21. $\mathcal{D} = [0, 1]$, $\mathcal{R} = [0, 1]$
 23. $\mathcal{D} = [-4, 0]$, $\mathcal{R} = [1, 2]$



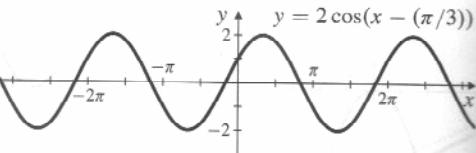
19. period π



21. period 2



23.



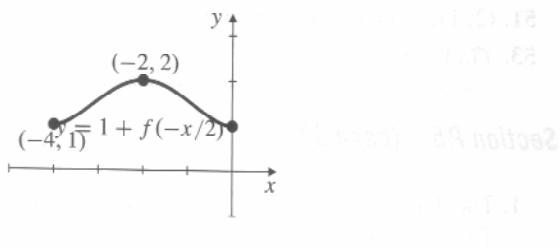
25. $\cos \theta = -4/5$, $\tan \theta = -3/4$
 27. $\sin \theta = -2\sqrt{2}/3$, $\tan \theta = -2\sqrt{2}$
 29. $\cos \theta = -\sqrt{3}/2$, $\tan \theta = 1/\sqrt{3}$
 31. $a = 1$, $b = \sqrt{3}$ 33. $b = 5/\sqrt{3}$, $c = 10/\sqrt{5}$
 35. $a = b \tan A$ 37. $a = b \cot B$
 39. $c = b \sec A$ 41. $\sin A = \sqrt{c^2 - b^2}/c$
 43. $\sin B = 3/(4\sqrt{2})$ 45. $\sin B = \sqrt{135}/16$
 47. $6/(1 + \sqrt{3})$
 49. $b = 4 \sin 40^\circ / \sin 70^\circ \approx 2.736$
 51. approx. 16.98 m

25.

27. (a) $A = 0$, B arbitrary, or $A = 1$, $B = 0$
 (b) $A = -1$, B arbitrary, or $A = 1$, $B = 0$

29. all integers

31.



33. f^2 , g^2 , $f \circ f$, $f \circ g$, $g \circ f$ are even
 fg , f/g , g/f , $g \circ g$ are odd
 $f + g$ is neither, unless either $f(x) = 0$ or $g(x) = 0$.

Section P.6 (page 45)

1. roots -5 and -2 ; $(x + 5)(x + 2)$
 3. roots $-1 \pm i$; $(x + 1 - i)(x + 1 + i)$
 5. roots $1/2$ (double) and $-1/2$ (double); $(2x - 1)^2(2x + 1)^2$
 7. roots $-1, \frac{1}{2} \pm \frac{\sqrt{3}}{2}i$; $(x+1)\left(x - \frac{1}{2} + \frac{\sqrt{3}}{2}i\right)\left(x - \frac{1}{2} - \frac{\sqrt{3}}{2}i\right)$
 9. roots 1 (triple) and -1 triple; $(x - 1)^3(x + 1)^3$
 11. roots $-2, i, -i, 1 + \sqrt{3}i, 1 - \sqrt{3}i$; $(x + 2)(x - i)(x + i)(x - 1 - \sqrt{3}i)(x - 1 + \sqrt{3}i)$

13. all real numbers

15. all real numbers except 0 and -1

17. $x + \frac{2x - 1}{x^2 - 2}$ 19. $x - 2 + \frac{x + 6}{x^2 + 2x + 3}$
 21. $P(x) = (x^2 - 2x + 2)(x^2 + 2x + 2)$

Section P.7 (page 57)

1. $-1/\sqrt{2}$ 3. $\sqrt{3}/2$
 5. $(\sqrt{3} - 1)/(2\sqrt{2})$ 7. $-\cos x$
 9. $-\cos x$ 11. $1/(\sin x \cos x)$
 17. $3 \sin x - 4 \sin^3 x$

Chapter 1 Limits and Continuity

Section 1.1 (page 63)

1. $((t + h)^2 - t^2)/h$ m/s 3. 4 m/s
 5. -3 m/s, 3 m/s, 0 m/s
 7. to the left, stopped, to the right
 9. height 2, moving down
 11. -1 ft/s, weight moving downward
 13. day 45

Section 1.2 (page 71)

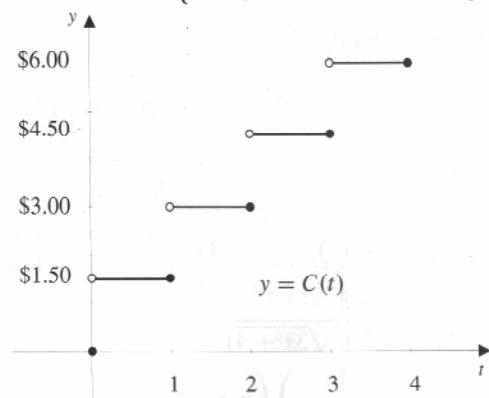
- | | |
|------------------------|--------------------|
| 1. (a) 1, (b) 0, (c) 1 | 3. 1 |
| 5. 0 | 7. 1 |
| 9. $2/3$ | 11. 0 |
| 13. 0 | 15. does not exist |
| 17. $1/6$ | 19. 0 |
| 21. -1 | 23. does not exist |
| 25. 2 | 27. $3/8$ |
| 29. $-1/2$ | 31. $8/3$ |

33. $1/4$
 37. $2x$
 41. $1/(2\sqrt{x})$
 45. $1/2$
 49. 0
 53. does not exist
 57. $-1/(2a)$
 61. -2
 65. (a) 0, (b) 8, (c) 9, (d) -3
 67. 5
 71. 0.7071
 75. 2
 77. $x^{1/3} < x^3$ on $(-1, 0)$ and $(1, \infty)$,
 $x^{1/3} > x^3$ on $(-\infty, -1)$ and $(0, 1)$,
 $\lim_{x \rightarrow a} h(x) = a$ for $a = -1, 0$, and 1

Section 1.3 (page 78)

1. $1/2$
 5. 0
 9. $-2/\sqrt{3}$
 13. $+\infty$
 17. $-\infty$
 21. ∞
 25. ∞
 29. -2
 33. horiz: $y = 0, y = -1$, vert: $x = 0$
 35. 1
 39. $-\infty$
 43. -1
 47. 3
 51. 1
3. $-3/5$
 7. -3
 11. does not exist
 15. 0
 19. $-\infty$
 23. $-\infty$
 27. $-\sqrt{2}/4$
 31. -1
 37. 1
 41. 2
 45. 1
 49. does not exist

53. $C(t)$ has a limit at every real t except at the integers.
 $\lim_{t \rightarrow t_0^-} C(t) = C(t_0)$ everywhere, but
 $\lim_{t \rightarrow t_0^+} C(t) = \begin{cases} C(t_0) & \text{if } t_0 \text{ not integral} \\ C(t_0) + 1.5 & \text{if } t_0 \text{ an integer} \end{cases}$



55. (a) B, (b) A, (c) A, (d) A

Section 1.4 (page 87)

1. at -2 , right cont. and cont., at -1 disc., at 0 disc. but left cont., at 1 disc. and right cont., at 2 disc.
 3. no abs. max, abs. min 0 5. no
 7. cont. everywhere
 9. cont. everywhere except at $x = 0$, disc. at $x = 0$
 11. cont. everywhere except at the integers, discontinuous but left-continuous at the integers
 13. 4, $x + 2$ 15. $1/5$, $(t - 2)/(t + 2)$
 17. $k = 8$ 19. no max, min = 0
 21. 16 23. 5
 25. f positive on $(-1, 0)$ and $(1, \infty)$; f negative on $(-\infty, -1)$ and $(0, 1)$
 27. f positive on $(-\infty, -2)$, $(-1, 1)$ and $(2, \infty)$; f negative on $(-2, -1)$ and $(1, 2)$
 35. max 1.593 at -0.831 , min -0.756 at 0.629
 37. max $31/3 \approx 10.333$ at $x = 3$, min 4.762 at $x = 1.260$
 39. 0.682
 41. -0.6367326508 , 1.409624004

Section 1.5 (page 92)

1. between 12°C and 20°C

3. (1.99, 2.01) 5. $(0.81, 1.21)$
 7. $\delta = 0.01$ 9. $\delta \approx 0.0165$

Review Exercises (page 93)

1. 13 3. 12
 5. 4 7. does not exist
 9. does not exist 11. $-\infty$
 13. $12\sqrt{3}$ 15. 0
 17. does not exist 19. $-1/3$
 21. $-\infty$ 23. ∞
 25. does not exist 27. 0
 29. 2 31. no disc.
 33. disc. and left cont. at 2
 35. disc. and right cont. at $x = 1$
 37. no disc.

Challenging Problems (page 94)

1. to the right 3. $-1/4$
 5. 3 7. T, F, T, F, F

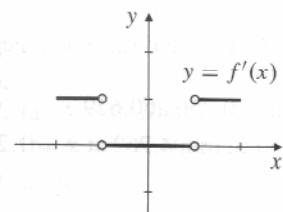
Chapter 2 Differentiation**Section 2.1 (page 100)**

1. $y = 3x - 1$ 3. $y = 8x - 13$
 5. $y = 12x + 24$ 7. $x - 4y = -5$
 9. $x - 4y = -2$ 11. $y = 2x_0x - x_0^2$

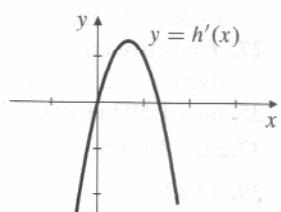
13. no

17. yes, $x = 0$ 19. (a) $3a^2$; (b) $y = 3x - 2$ and $y = 3x + 2$ 21. $(1, 1)$, $(-1, 1)$ 15. yes, $x = -2$ 23. $k = 3/4$ 25. horiz. tangent at $(0, 0)$, $(3, 108)$, $(5, 0)$ 27. horiz. tangent at $(-0.5, 1.25)$, no tangents at $(-1, 1)$ and $(1, -1)$ 29. horiz. tangent at $(0, -1)$ 31. no, consider $y = x^{2/3}$ at $(0, 0)$ **Section 2.2 (page 107)**

1.



3.

5. on $[-2, 2]$ except at $x = -1$ and $x = 1$ 7. slope positive for $x < 1.5$, negative for $x > 1.5$; horizontal tangent at $x = 1.5$ 9. singular points at $x = -1, 0, 1$, horizontal tangents at about $x = \pm 0.57$ 11. (a) $y' = 2x - 3$, (b) $dy = (2x - 3)dx$ 13. (a) $f'(x) = 3x^2$, (b) $df(x) = 3x^2dx$ 15. (a) $g'(x) = -\frac{4}{(2+x)^2}$, (b) $dg(x) = -\frac{4}{(2+x)^2}dx$ 17. (a) $F'(t) = \frac{1}{\sqrt{2t+1}}$, (b) $dF(t) = \frac{1}{\sqrt{2t+1}}dt$ 19. (a) $y' = 1 - \frac{1}{x^2}$, (b) $dy = \left(1 - \frac{1}{x^2}\right)dx$ 21. (a) $F'(x) = -\frac{x}{(1+x^2)^{3/2}}$, (b) $dF(x) = -\frac{x}{(1+x^2)^{3/2}}dx$ 23. (a) $y' = -\frac{1}{2(1+x)^{3/2}}$, (b) $dy = -\frac{1}{2(1+x)^{3/2}}dx$ 25. Define $f(0) = 0$, f is not differentiable at 027. at $x = -1$ and $x = -2$

29.

x	$\frac{f(x) - f(2)}{x - 2}$
1.9	-0.26316
1.99	-0.25126
1.999	-0.25013
1.9999	-0.25001

$$\frac{d}{dx} \left(\frac{1}{x} \right) \Big|_{x=2} = -\frac{1}{4}$$

x	$\frac{f(x) - f(2)}{x - 2}$
2.1	-0.23810
2.01	-0.24876
2.001	-0.24988
2.0001	-0.24999

31. $x - 6y = -15$ 33. $y = \frac{2}{a^2+a} - \frac{2(2a+1)}{(a^2+a)^2}(t-a)$ 35. $22t^{21}$, all t 37. $-(1/3)x^{-4/3}$, $x \neq 0$ 39. $(119/4)s^{115/4}$, $s \geq 0$

41. -16

43. $1/(8\sqrt{2})$ 47. $y = 6x - 9$ and $y = -2x - 1$ 49. $\frac{1}{2\sqrt{2}}$ 45. $y = a^2x - a^3 + \frac{1}{a}$ 53. $f'(x) = \frac{1}{3}x^{-2/3}$ **Section 2.3 (page 115)**1. $6x - 5$ 3. $2Ax + B$ 5. $\frac{1}{3}s^4 - \frac{1}{5}s^2$ 7. $\frac{1}{3}t^{-2/3} + \frac{1}{2}t^{-3/4} + \frac{3}{5}t^{-4/5}$ 9. $x^{2/3} + x^{-8/5}$ 11. $\frac{5}{2\sqrt{x}} - \frac{3}{2}\sqrt{x} - \frac{5}{6}x^{3/2}$ 13. $-\frac{2x+5}{(x^2+5x)^2}$ 15. $\frac{\pi^2}{(2-\pi t)^2}$ 17. $(4x^2-3)/x^4$ 19. $-t^{-3/2} + (1/2)t^{-1/2} + (3/2)\sqrt{t}$ 21. $-\frac{24}{(3+4x)^2}$ 23. $\frac{1}{\sqrt{t}(1-\sqrt{t})^2}$ 25. $\frac{ad-bc}{(cx+d)^2}$ 27. $10 + 70x + 150x^2 + 96x^3$ 29. $2x(\sqrt{x}+1)(5x^{2/3}-2) + \frac{1}{2\sqrt{x}}(x^2+4)(5x^{2/3}-2)$
 $+ \frac{10}{3}x^{-1/3}(x^2+4)(\sqrt{x}+1)$ 31. $\frac{6x+1}{(6x^2+2x+1)^2}$

33. -1

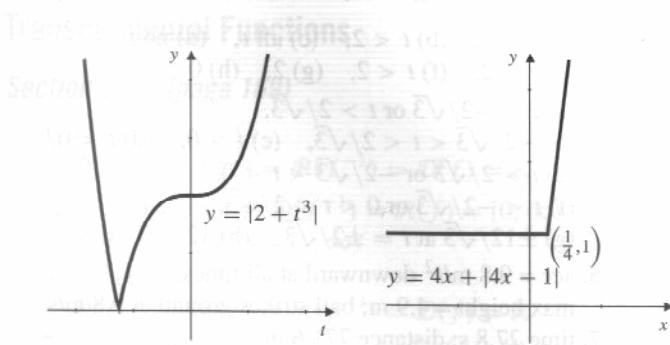
35. 20

37. $-\frac{1}{2}$ 39. $-\frac{1}{18\sqrt{2}}$ 41. $y = 4x - 6$

43. (1, 2) and (-1, -2)

45. $(-\frac{1}{2}, \frac{4}{3})$ 47. $y = b - \frac{b^2x}{4}$ 49. $y = 12x - 16$, $y = 3x + 2$ 51. $x/\sqrt{x^2+1}$ **Section 2.4 (page 120)**1. $12(2x+3)^5$ 3. $-20x(4-x^2)^9$ 5. $\frac{30}{t^2} \left(2 + \frac{3}{t}\right)^{-11}$ 7. $\frac{12}{(5-4x)^2}$ 9. $-2x \operatorname{sgn}(1-x^2)$ 11. $\begin{cases} 8 & \text{if } x > 1/4 \\ 0 & \text{if } x < 1/4 \end{cases}$ 13. $\frac{-3}{2\sqrt{3x+4}(2+\sqrt{3x+4})^2}$ 15. $-\frac{5}{3} \left(1 - \frac{1}{(u-1)^2}\right) \left(u + \frac{1}{u-1}\right)^{-8/3}$

17.



23. $(5 - 2x)f'(5x - x^2)$

25. $\frac{f'(x)}{\sqrt{3 + 2f(x)}}$

27. $\frac{1}{\sqrt{x}}f'(3 + 2\sqrt{x})$

29. $15f'(4 - 5t)f'(2 - 3f(4 - 5t))$

31. $\frac{3}{2\sqrt{2}}$

33. 102

35. $-6 \left(1 - \frac{15}{2}(3x)^4 \left((3x)^5 - 2\right)^{-3/2}\right)$
 $\times \left(x + \left((3x)^5 - 2\right)^{-1/2}\right)^{-7}$

37. $y = 2^{3/2} - \sqrt{2}(x + 1)$ 39. $y = \frac{1}{27} + \frac{5}{162}(x + 2)$

41. $\frac{x(x^4 + 2x^2 - 2)}{(x^2 + 1)^{5/2}}$ 43. 857,592

45. no; yes; both functions are equal to x^2 .**Section 2.5 (page 125)**

3. $-3 \sin 3x$

5. $\pi \sec^2 \pi x$

7. $3 \csc^2(4 - 3x)$

9. $r \sin(s - rx)$

11. $2\pi x \cos(\pi x^2)$

13. $\frac{-\sin x}{2\sqrt{1 + \cos x}}$

15. $-(1 + \cos x) \sin(x + \sin x)$

17. $(3\pi/2) \sin^2(\pi x/2) \cos(\pi x/2)$

19. $a \cos 2at$

21. $2 \cos(2x) + 2 \sin(2x)$

23. $\sec^2 x - \csc^2 x$

25. $\tan^2 x$

27. $-t \sin t$

29. $1/(1 + \cos x)$

31. $2x \cos(3x) - 3x^2 \sin(3x)$

33. $2x[\sec(x^2) \tan^2(x^2) + \sec^3(x^2)]$

35. $-\sec^2 t \sin(\tan t) \cos(\cos(\tan t))$

39. $y = \pi - x$, $y = x - \pi$

41. $y = 1 - (x - \pi)/4$, $y = 1 + 4(x - \pi)$

43. $y = \frac{1}{\sqrt{2}} + \frac{\pi}{180\sqrt{2}}(x - 45)$

45. $\pm(\pi/4, 1)$ 49. yes, (π, π)

51. yes, $(2\pi/3, (2\pi/3) + \sqrt{3}), (4\pi/3, (4\pi/3) - \sqrt{3})$

53. 2

55. 1

57. 1/2

59. infinitely many, 0.336508, 0.161228

Section 2.6 (page 130)

1. $\begin{cases} y' = -14(3 - 2x)^6, \\ y'' = 168(3 - 2x)^5, \\ y''' = -1680(3 - 2x)^4 \end{cases}$

3. $\begin{cases} y' = -12(x - 1)^{-3}, \\ y'' = 36(x - 1)^{-4}, \\ y''' = -144(x - 1)^{-5} \end{cases}$

5. $\begin{cases} y' = \frac{1}{3}x^{-2/3} + \frac{1}{3}x^{-4/3}, \\ y'' = -\frac{2}{9}x^{-5/3} - \frac{4}{9}x^{-7/3}, \\ y''' = \frac{10}{27}x^{-8/3} + \frac{28}{27}x^{-10/3} \end{cases}$

7. $\begin{cases} y' = \frac{5}{2}x^{3/2} + \frac{3}{2}x^{-1/2}, \\ y'' = \frac{15}{4}x^{1/2} - \frac{3}{4}x^{-3/2}, \\ y''' = \frac{15}{8}x^{-1/2} + \frac{9}{8}x^{-5/2} \end{cases}$

9. $y' = \sec^2 x$, $y'' = 2 \sec^2 x \tan x$, $y''' = 4 \sec^2 x \tan^2 x + 2 \sec^4 x$

11. $y' = -2x \sin(x^2)$, $y'' = -2 \sin(x^2) - 4x^2 \cos(x^2)$,
 $y''' = -12x \cos(x^2) + 8x^3 \sin(x^2)$

13. $(-1)^n n! x^{-(n+1)}$ 15. $n!(2 - x)^{-(n+1)}$

17. $(-1)^n n! b^n (a + bx)^{-(n+1)}$

19. $f^{(n)} = \begin{cases} (-1)^k a^n \cos(ax) & \text{if } n = 2k \\ (-1)^{k+1} a^n \sin(ax) & \text{if } n = 2k + 1 \end{cases}$ where
 $k = 0, 1, 2, \dots$

21. $f^{(n)} = (-1)^k [a^n x \sin(ax) - na^{n-1} \cos(ax)]$ if
 $n = 2k$, or $(-1)^k [a^n x \cos(ax) + na^{n-1} \sin(ax)]$ if
 $n = 2k + 1$, where $k = 0, 1, 2, \dots$

23. $-\frac{1 \times 3 \times 5 \times \cdots \times (2n-3)}{2^n} 3^n (1-3x)^{-(2n-1)/2}$
 $(n = 2, 3, \dots)$

Section 2.7 (page 136)

1. -0.0025, 0.4975

3. -1/40, -1/40

5. 4%

7. -4%

9. 1%

11. 6%

13. 8 ft²/ft

15. $1/\sqrt{\pi A}$ units/square unit

17. 16π m³/m

19. $\frac{dC}{dA} = \sqrt{\frac{\pi}{A}}$ length units/area unit

21. (a) 10,500 L/min, 3,500 L/min, (b) 7,000 L/min

23. decreases at 1/8 pound/mi

25. (a) \$300, (b) $C(101) - C(100) = \$299.50$

27. (a) -\$2.00, (b) \$9.11

Section 2.8 (page 143)

1. $c = \frac{a+b}{2}$

3. $c = \pm \frac{2}{\sqrt{3}}$

9. Incr. $x > 0$, decr. $x < 0$

11. Incr. on $(-\infty, -4)$ and $(0, \infty)$, decr. on $(-4, 0)$

13. inc. on $(-\infty, -\frac{2}{\sqrt{3}})$ and $(\frac{2}{\sqrt{3}}, \infty)$, dec. on $(-\frac{2}{\sqrt{3}}, \frac{2}{\sqrt{3}})$
 15. inc. on $(-2, 0)$ and $(2, \infty)$; dec. on $(-\infty, -2)$ and $(0, 2)$
 17. inc. on $(-\infty, 3)$ and $(5, \infty)$; dec. on $(3, 5)$
 19. inc. on $(-\infty, \infty)$ 23. 0.535898, 7.464102
 25. 0, -0.518784

Section 2.9 (page 148)

$$\begin{array}{ll} 1. \frac{1-y}{2+x} & 3. \frac{2x+y}{3y^2-x} \\ 5. \frac{2-2xy^3}{3x^2y^2+1} & 7. -\frac{3x^2+2xy}{x^2+4y} \\ 9. 2x+3y=5 & 11. y=x \\ 13. y=1-\frac{4}{4-\pi}\left(x-\frac{\pi}{4}\right) & \\ 15. y=2-x & 17. \frac{2(y-1)}{(1-x)^2} \\ 19. \frac{(2-6y)(1-3x^2)^2}{(3y^2-2y)^3}-\frac{6x}{3y^2-2y} & \\ 21. -a^2/y^3 & 23. 0 \\ 25. -26 & \end{array}$$

Section 2.10 (page 154)

$$\begin{array}{ll} 1. 5x+C & 3. \frac{2}{3}x^{3/2}+C \\ 5. \frac{1}{4}x^4+C & 7. -\cos x+C \\ 9. a^2x-\frac{1}{3}x^3+C & 11. \frac{4}{3}x^{3/2}+\frac{9}{4}x^{4/3}+C \\ 13. \frac{1}{12}x^4-\frac{1}{6}x^3+\frac{1}{2}x^2-x+C & \\ 15. \frac{1}{2}\sin(2x)+C & 17. \frac{-1}{1+x}+C \\ 19. \frac{1}{3}(2x+3)^{3/2}+C & 21. -\cos(x^2)+C \\ 23. \tan x-x+C & 25. (x+\sin x \cos x)/2+C \\ 27. y=\frac{1}{2}x^2-2x+3, \text{ all } x & \\ 29. y=2x^{3/2}-15, (x>0) & \\ 31. y=\frac{A}{3}(x^3-1)+\frac{B}{2}(x^2-1)+C(x-1)+1, (\text{all } x) & \\ 33. y=\sin x+(3/2), (\text{all } x) & \\ 35. y=1+\tan x, -\pi/2 < x < \pi/2 & \\ 37. y=x^2+5x-3, (\text{all } x) & \\ 39. y=\frac{x^5}{20}-\frac{x^2}{2}+8, (\text{all } x) & \\ 41. y=1+x-\cos x, (\text{all } x) & \\ 43. y=3x-\frac{1}{x}, (x>0) & \\ 45. y=-\frac{7\sqrt{x}}{2}+\frac{18}{\sqrt{x}}, (x>0) & \end{array}$$

Section 2.11 (page 160)

1. (a) $t > 2$, (b) $t < 2$, (c) all t , (d) no t ,
 (e) $t > 2$, (f) $t < 2$, (g) 2, (h) 0
 3. (a) $t < -2/\sqrt{3}$ or $t > 2/\sqrt{3}$,
 (b) $-2/\sqrt{3} < t < 2/\sqrt{3}$, (c) $t > 0$, (d) $t < 0$,
 (e) $t > 2/\sqrt{3}$ or $-2/\sqrt{3} < t < 0$,
 (f) $t < -2/\sqrt{3}$ or $0 < t < 2/\sqrt{3}$,
 (g) $\pm 12/\sqrt{3}$ at $t = \pm 2/\sqrt{3}$, (h) 12
 5. acc = 9.8 m/s^2 downward at all times;
 max height = 4.9 m; ball strikes ground at 9.8 m/s
 7. time 27.8 s; distance 771.6 m
 9. $4h \text{ m}, \sqrt{2}v_0 \text{ m/s}$ 11. 400 ft
 13. 0.833 km
 15. $v = \begin{cases} 2t & \text{if } 0 < t \leq 2 \\ 4 & \text{if } 2 < t < 8 \\ 20-2t & \text{if } 8 \leq t < 10 \end{cases}$
 v is continuous for $0 < t < 10$.
 $a = \begin{cases} 2 & \text{if } 0 < t < 2 \\ 0 & \text{if } 2 < t < 8 \\ -2 & \text{if } 8 < t < 10 \end{cases}$
 a is continuous except at $t = 2$ and $t = 8$.
 Maximum velocity 4 is attained for $2 \leq t \leq 8$.

17. 7 s 19. 448 ft

Review Exercises (page 161)

1. $18x+6$ 3. -1
 5. $6\pi x+12y=6\sqrt{3}+\pi$
 7. $\frac{\cos x-1}{(x-\sin x)^2}$ 9. $x^{-3/5}(4-x^{2/5})^{-7/2}$
 11. $-2\theta \sec^2 \theta \tan \theta$ 13. $20x^{19}$
 15. $-\sqrt{3}$ 17. $-2xf'(3-x^2)$
 19. $2f'(2x)\sqrt{g(x/2)} + \frac{f(2x)g'(x/2)}{4\sqrt{g(x/2)}}$
 21. $f'(x+(g(x))^2)(1+2g(x)g'(x))$
 23. $\cos x f'(\sin x) g(\cos x) - \sin x f(\sin x) g'(\cos x)$
 25. $7x+10y=24$ 27. $\frac{x^3}{3}-\frac{1}{x}+C$
 29. $2\tan x+3\sec x+C$ 31. $4x^3+3x^4-7$
 33. $I_1 = x \sin x + \cos x + C, I_2 = \sin x - x \cos x + C$
 35. $y=3x$
 37. points $k\pi$ and $k\pi/(n+1)$ where k is any integer
 39. $(0, 0), (\pm 1/\sqrt{2}, 1/2)$, dist. = $\sqrt{3}/2$ units
 41. (a) $k=g/R$ 43. 15.3 m
 45. 80 ft/s or about 55 mph

Challenging Problems (page 162)

3. (a) 0, (b) $3/8$, (c) 12, (d) -48 , (e) $3/7$, (f) 21
 13. $f(m)=C-(m-B)^2/(4A)$
 17. (a) $3b^2 > 8ac$
 19. (a) 3 s, (b) $t=7$ s, (c) $t=12$ s, (d) about 13.07 m/s^2 ,
 (e) 197.5 m, (f) 60.3 m.